

PATENT ABSTRACTS OF JAPAN

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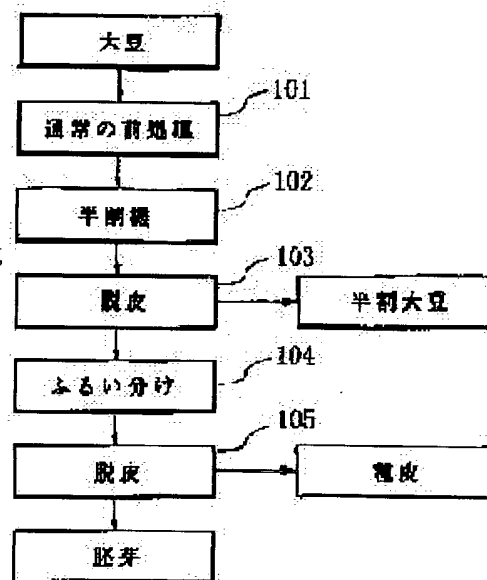
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(54) SEPARATION OF HIGHLY PURE EMBRYO BY MECHANICAL SEPARATION

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method for obtaining embryos in a high concentration by separating the only embryos in soybeans by utilizing the difference of specific gravity of the embryo and albumen, and a method for obtaining the embryos in the high concentration without damaging the nutrient originally included in the embryo and further to obtain a product containing soybean isoflavone in the high concentration and having high additional value.

SOLUTION: This method for separating highly pure embryo comprises using a soybean embryo mixture (containing 2% embryo) obtained by common soybean-crushing steps 101 and 102 for breaking the soybeans into half as a raw material, separating the raw material to halved soybeans and seed coats including 10-20% embryo at a seed coat-removing step 103, separating the seed coats including 40-70% embryo from the seed coats including 10-20% embryo by a sieving step 104, and further separating the seed coats including 40-70% embryo into the embryo (90-97%) and the separated seed coats by a gravity separation 105.



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CLAIMS

[Claim 1] Soybean germ mixture (2% of germs) which came out through the half-segmented crushing process of the usual soybean is used as a raw material. At a self-renewal process A half-segmented soybean, The separation approach of the high grade germ which detaches this by specific gravity further and is divided into a germ (90 - 97%), and a testa after separating into the testa which contained the germ 10 to 20% and separating the testa which screens from this testa germ mixture and contains a germ 40 to 70% through a process.

[Claim 2] The separation approach of the high grade germ according to claim 1 characterized by separating into a half-segmented soybean and the testa containing a germ in said self-renewal process.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the approach of separating the germ of an soybean, and relates to the approach the gravity separation using a machine separates in more detail the germ which is a functional part in an soybean.

[0002]

[Description of the Prior Art] Conventionally, as for the research on beans, it will be so actual that it is called "the food of a miracle", "the meat produced from a field", etc. while the research on a nutrition component and vegetation with beans abundant [close] progresses actively that an interest is increasing in the 1950s.

[0003] The principal component of beans consists of 40% of protein, 20% of fats, a carbohydrate, etc., and is divided, and the physiological active substance which helps constant maintenance of human being and biorhythm to beans is contained in abundance.

[0004] The research result about the isoflavone of the soybean from which it begins to be recognized recently that close is a component in which the isoflavone (isoflavone) in a physiological active substance has functionality, and about 1000 affair is reached in five years also in the U.S. is released.

[0005] It is especially reported that ZENISUTAIN (Genistein) which is a kind of isoflavone has a preventive effect in a female breast cancer, the osteoporosis of an climacteric symptom, and ***** before a male.

[0006] Although as another percentage as the section of an soybean consisted of 2% of germs, 90% of albumen, and 8% of testas, when it was contrary although the total isoflavone content of an soybean was about 0.2%, and about 2% which is 10 times was generally contained compared with the albumen part in the germ, it was known, but in order to acquire isoflavone, the method of extracting only a germ part came to be demanded. ** -- many techniques about the process which separates a germ with a request [like] are well-known.

[0007] In the Japan patent announcement 56-39176th The technique of obtaining the concentration soybean germ which ***** sieving and wind selection for the grinding object of an soybean, and contains 50 - 60% of soybean germs is introduced. In the Japan patent announcement No. 100256 [62 to] As the block diagram (signs 201-206) of drawing 2 showed, the method of making the soybean germ concentrate to which the usual pretreatment was performed emit to low voltage under elevated-temperature high voltage, expanding only a germ 1.5 to 5 times, detaching this by specific gravity, and obtaining a germ is well-known. Moreover, after carrying out crushing of the soybean to the Japan patent announcement No. 82063 [Showa 59 to] with a half-segmented machine, and an auxiliary self-renewal machine removes a large testa, and a ***** machine removes the testa grinding-back and removing a testa by the air classifier, the approach of carrying out the count of separation to a half-segmented soybean and a germ with a sieving machine is well-known.

[0008]

[Problem(s) to be Solved by the Invention] By the way, the concentration germ of the Japan patent announcement No. 39176 [57 to] The content of a germ is low. The Japan patent announcement No. 100256 [62 to] ***** which the germ contains by making the high voltage of 7.5 atmospheric pressures carry out the dilatation reaction of the germ is destroyed. Japanese lacquer, The trouble of the danger of relation to work environment that an activity will be done under elevated-temperature high voltage is held. The Japan patent announcement No. 82063 [Showa 59 to] After a half-segmented machine separates an soybean into three kinds, a germ (2%), albumen (90%), a testa (8%), etc., a testa by dissociating using an auxiliary self-renewal machine, a ***** machine, an air classifier, etc. Many production facilities are needed, and since ***** may arise a half-segmented soybean passing

through and carrying out a process [like], there is a possibility that the purity of a germ may fall.

[0009] Then, it was made in order that this invention might solve the above-mentioned various troubles, and the object of ***** and this invention is by separating only the germ in an soybean using the specific gravity difference of a germ and albumen to offer the approach of acquiring a high-concentration germ.

[0010] Moreover, other objects of this invention have a germ in offering the approach of acquiring a high-concentration germ without loss of ***** originally included. The object of further others of this invention is to offer a high-concentration soybean isoflavone content product with high added value.

[0011]

[Means for Solving the Problem] The separation approach of the high grade germ which starts claim 1 in order to solve the above-mentioned technical problem Soybean germ mixture (2% of germs) which came out through the half-segmented crushing process of the usual soybean is used as a raw material. After separating into a half-segmented soybean and the testa which contained the germ 10 to 20% at a self-renewal process and separating the testa which screens from this testa germ mixture and contains a germ 40 to 70% through a process, he detaches this by specific gravity further, and is trying to separate into a germ (90 - 97%), and a testa.

[0012] Moreover, suppose that the separation approach of the high grade germ concerning claim 2 is separated into a half-segmented soybean and the testa containing a germ in said self-renewal process.

[0013]

[Embodiment of the Invention] In order to attain the above-mentioned object, this invention divides only the germ in an soybean into a high grade by mechanical gravity separation using an soybean germ and the specific gravity difference of albumen.

[0014] The germ separation approach of this invention is explained in full detail based on the block diagram of drawing 1 below. Although the germ mixture of an soybean could be obtained at the processing process of each usual soybean, after heating in order to select an soybean carefully, to remove a contaminant, in order to divide the germ of an soybean into a high grade, and to adjust for about 6 - 7% of moisture, the germ mixture (2% or less of germs) of the soybean which cooled and was built through the half-segmented crushing process was used as a raw material (signs 101 and 102).

[0015] the germ mixture of the above-mentioned soybean should pass a self-renewal process (sign 103) -- it separates into a half-segmented soybean and the mixture of a germ and a testa. Throwing in a half-segmented soybean at the processing process of an soybean, a testa and germ mixture (20% of germs) sift out (sign 104), and transport testa germ mixture (germ 30-60%) to a gravity separation process (sign 105). As for a germ and a testa, only a germ is separated by the difference of specific gravity at this process. ** -- the rate of acquisition of the germ by the process [like] is 90% or more.

[0016] Hereafter, although this invention is explained more to a detail through an example, this invention is not limited to the following example.

[0017]

[Example 1] In order to divide the processing in process of an soybean, and the germ of an soybean into a high grade, after selecting the soybean carefully and carrying out heating cooling (sign 101), 100kg (2% or less of germs) of germ mixture of the soybean which came out through the half-segmented crushing process (sign 102) was used as a raw material.

[0018] It was divided into 89kg of half-segmented soybeans, and a testa and 11kg (20% of germs) of germ mixture, the germ mixture (2% or less of germs) of the above-mentioned soybean passing along a self-renewal process (sign 103). Throwing in the half-segmented soybean at the processing process of an soybean, 10# and 14# screen passed and sifted out, the reclosing of the testa germ mixture (20% of germs) was carried out at the processing process of an soybean, and 10(sign 104) # top and the bottom of 14# obtained 4.6kg of testa germ mixture of a residual on 14#. The cyclone was made to pass the above-mentioned testa germ mixture, it separated into the testa and the germ (sign 105), and 1.6kg (95%) of germs of a high grade was obtained eventually.

[0019]

[Effect of the Invention] As mentioned above, since a germ's being separable by high yield and a lot of [at once] soybean germ can be separated and a ****-installation cost is ****(ed) as compared with the germ separation approach by the conventional technique, the germ separation approach by this invention is effective also from a costs side.

[0020] Moreover, since the gravity separation according an soybean to a half-segmented crushing process and a machine only separates the germ of them, functional ***** of a germ is not destroyed but there is outstanding

effectiveness that owner ***** of a germ can be held.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the approach of separating the germ of an soybean, and relates to the approach the gravity separation using a machine separates in more detail the germ which is a functional part in an soybean.

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MEANS

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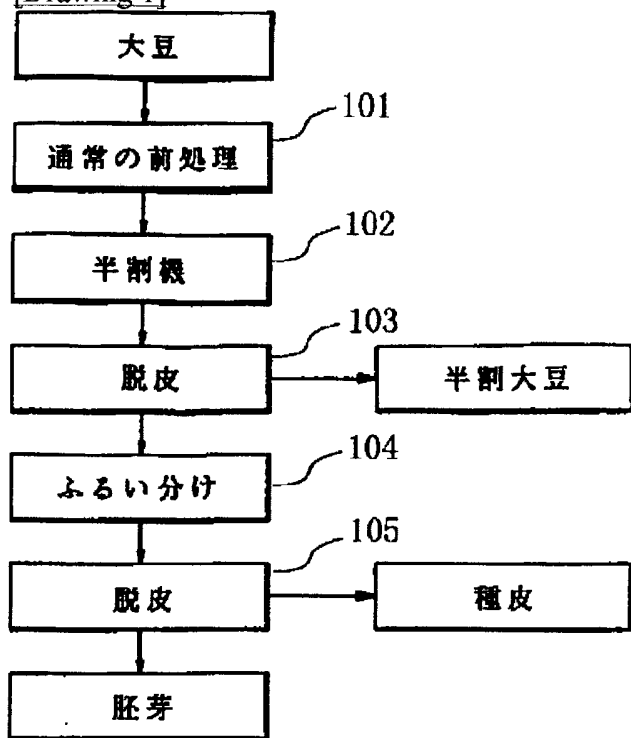
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

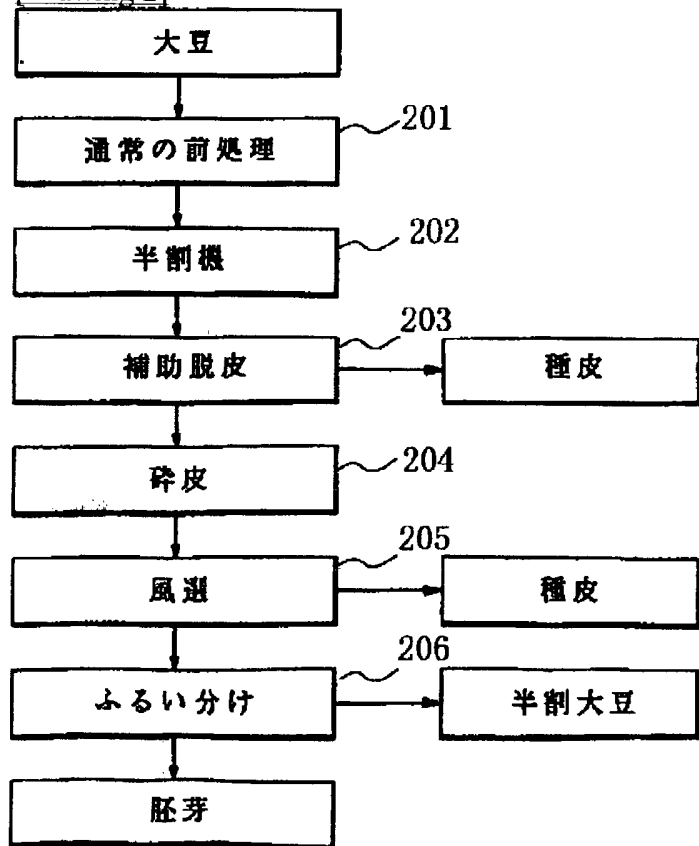
[Drawing 1] It is the block diagram showing the germ separation process by this invention.

[Drawing 2] It is the block diagram showing the germ separation approach by the Japan patent announcement No. 82036 [Showa 59 to].

[Drawing 1]



[Drawing 2]



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(33) 優先権主張国 韓国 (K R)

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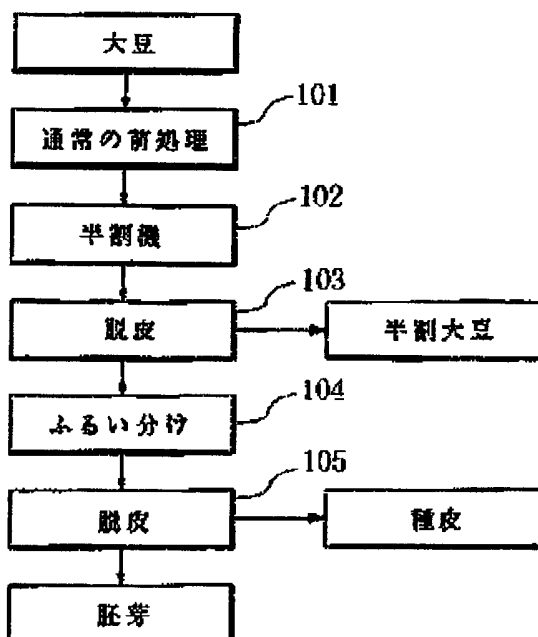
(74) 代理人 弁理士 田代 蒸治 (外1名)

(54) 【発明の名称】 機械的分離による高純度胚芽の分離方法

(57) 【要約】

【課題】 胚芽と胚乳の比重差を利用して大豆中の胚芽のみを分離することにより、高濃度の胚芽を取得する方法を提供し、また、胚芽が本来含んでいる栄養素の損失なしに高濃度の胚芽を取得する方法を提供し、さらに、高付加価値のある高濃度の大豆イソフラボン含有製品を提供することにある。

【解決手段】 通常の大豆半割粗砕工程(符号101、102)をへて出た大豆胚芽混合物(胚芽2%)を原料として脱皮工程(符号103)で半割大豆と胚芽を10~20%含有した種皮に分離し、これをふるい分け工程(符号104)を通して胚芽を40~70%含有した種皮とに分離した後、これを比重分離して(符号105)、胚芽(90~97%)と種皮とに分離する方法。



【特許請求の範囲】

【請求項1】 通常大豆の半割粗砕工程をへて出た大豆胚芽混合物（胚芽2%）を原料として脱皮工程で半割大豆と、胚芽を10～20%含有した種皮とに分離し、この種皮胚芽混合物からふるい分け工程を通じて胚芽を40～70%含有する種皮を分離した後、更にこれを比重分離して胚芽（90～97%）と種皮とに分離する高純度胚芽の分離方法。

【請求項2】 前記脱皮工程において、半割大豆と、胚芽を含有した種皮とに分離することを特徴とする請求項1に記載の高純度胚芽の分離方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、大豆の胚芽を分離する方法に係り、より詳しくは、大豆中の機能的部分である胚芽を機械を利用した比重分離により分離する方法に関するものである。

【0002】

【従来の技術】従来、豆に関する研究は、1950年代に入って豆の豊富な栄養成分および栽培に関する研究が活発に進むなか、「奇跡の食物」、「畑から生まれる肉類」などと呼ばれるほどに関心が高まりつつあるのが現実である。

【0003】豆の主成分は、蛋白質40%、脂肪20%および炭水化物などで構成されており、とりわけ、豆には人間の恒常性維持および生体リズムを助ける生体活性物質が豊富に含まれている。

【0004】最近に入って生体活性物質中のイソフラボン（isoflavone）が機能性をもつ成分であることが認識され始めて米国においてだけでも5年間に1000余件のぼる大豆のイソフラボンに関する研究結果が発表されている。

【0005】とりわけ、イソフラボンの一環であるゼニステイン（Genistein）は、女性の乳房癌と更年期症状の骨多孔症および男性の前立腺癌に予防効果があることが報告されている。

【0006】一般に、大豆の部位別の構成比は、胚芽2%、胚乳90%、種皮8%で構成されているが、大豆の総イソフラボン含量は約0.2%であるのに反し、胚芽には胚乳部分に比べて10倍である2%程度を含有していると知られているが、イソフラボンを取得するために胚芽部分のみを抽出する方法が要請されるようになった。かような要請にともなって胚芽を分離する工程に関する技術は多数公知となっている。

【0007】日本国特許公告第56-39176には、大豆の粉砕物をふるい分けと風選を繰返して大豆胚芽50～60%を含有する濃縮大豆胚芽を得る技術が紹介されており、日本国特許公告第62-100256号

混高圧下で低圧に放出させて胚芽のみを1.5～5倍に膨張させて、これを比重分離して胚芽を得る方法が公知となっている。また、日本国特許公告昭59-82063号には、大豆を半割機で粗砕した後、補助脱皮機で大種皮を除去して碎皮機で種皮を粉砕後、風選機で種皮を除去してから、ふるい分け機で半割大豆と胚芽とに分離回数する方法が公知となっている。

【0008】

【発明が解決しようとする課題】ところで、日本国特許公告第57-39176号の濃縮胚芽は、胚芽の含量が低く、日本国特許公告第62-100256号は、胚芽を7.5気圧の高圧に膨張反応させることにより、胚芽が含有している栄養素が破壊されうるし、高温高圧下で作業が行われる関係から、作業環境の危険性という問題点をかかえており、日本国特許公告昭59-82063号は、大豆を半割機で胚芽（2%）、胚乳（90%）、種皮（8%）などの3種類に分離した後、種皮を補助脱皮機、碎皮機、風選機などを利用して分離することにより、多くの生産設備を必要とし、半割大豆がかような工程をへしつづ碎豆が生じうるため、胚芽の純度が落ちるおそれがある。

【0009】そこで、本発明は上記種々の問題点を解決するためになされたものであつて、本発明の目的は、胚芽と胚乳の比重差を利用して大豆中の胚芽のみを分離することにより、高濃度の胚芽を取得する方法を提供することにある。

【0010】また、本発明の他の目的は、胚芽が本来含んでいる栄養素の損失なしに高濃度の胚芽を取得する方法を提供することにある。本発明のさらに他の目的は、高付加価値のある高濃度の大豆イソフラボン含有製品を提供することにある。

【0011】

【課題を解決するための手段】上記課題を解決するため請求項1に係る高純度胚芽の分離方法は、通常大豆の半割粗砕工程をへて出た大豆胚芽混合物（胚芽2%）を原料として、脱皮工程にて半割大豆と、胚芽を10～20%含有した種皮とに分離し、この種皮胚芽混合物からふるい分け工程を通じて胚芽を40～70%含有する種皮を分離した後、更にこれを比重分離して胚芽（90～97%）と種皮とに分離するようにしている。

【0012】また、請求項2に係る高純度胚芽の分離方法は、前記脱皮工程において、半割大豆と、胚芽を含有した種皮とに分離することとしている。

【0013】

【実施の形態】上記の目的を達成するため、本発明は大豆胚芽および胚乳の比重差を利用して機械的な比重分離によって大豆中の胚芽のみを高純度に分離する。

【0014】下記に本発明の胚芽分離方法を図1のプロ

の胚芽を高純度に分離するためには、大豆を精選して挟雜物を除去して約6～7%の水分に調節するために加熱したのち、冷却して半割粗砕過程を通じてつくられた大豆の胚芽混合物（胚芽2%以下）を原料として使用した（符号101、102）。

【0015】上記大豆の胚芽混合物は、脱皮工程（符号103）を経て半割大豆と、胚芽及び種皮の混合物とに分離される。半割大豆は、大豆の加工工程で投入し、種皮と胚芽混合物（胚芽20%）はふるい分けを行い（符号104）、種皮胚芽混合物（胚芽30～60%）を比重分離工程（符号105）に移送する。この工程では、胚芽と種皮は、比重の差により胚芽のみが分離されるようになっている。かような工程による胚芽の取得率は90%以上である。

【0016】以下、実施例を通じて本発明をより詳細に説明するが、本発明は下記の実施例に限定されるものではない。

【0017】

【実施例1】大豆の加工工程中、大豆の胚芽を高純度に分離するために、大豆を精選して加熱冷却させた（符号101）のち、半割粗砕過程（符号102）をへて出た大豆の胚芽混合物（胚芽2%以下）100Kgを原料として使用した。

【0018】上記大豆の胚芽混合物（胚芽2%以下）は、脱皮工程（符号103）を通りつつ半割大豆89Kg*

*と、種皮および胚芽混合物（胚芽20%）11Kgとに分離された。半割大豆は、大豆の加工工程で投入し、種皮胚芽混合物（胚芽20%）は10#と14#ふるいでふるい分けして（符号104）10#上と14#下は大豆の加工工程で再投入され、14#上に残留の種皮胚芽混合物4.6Kgを得た。上記種皮胚芽混合物をサイクロンに通過させて種皮と胚芽とに分離して（符号105）、最終的に高純度の胚芽（95%）1.6Kgを得た。

10 【0019】

【発明の効果】上述のように、本発明による胚芽分離方法は、従来技術による胚芽分離方法に比して高収率で胚芽を分離できるばかりか、一度に多量の大豆胚芽が分離でき、附随的な設備費が減縮されるため、費用面からも効果的である。

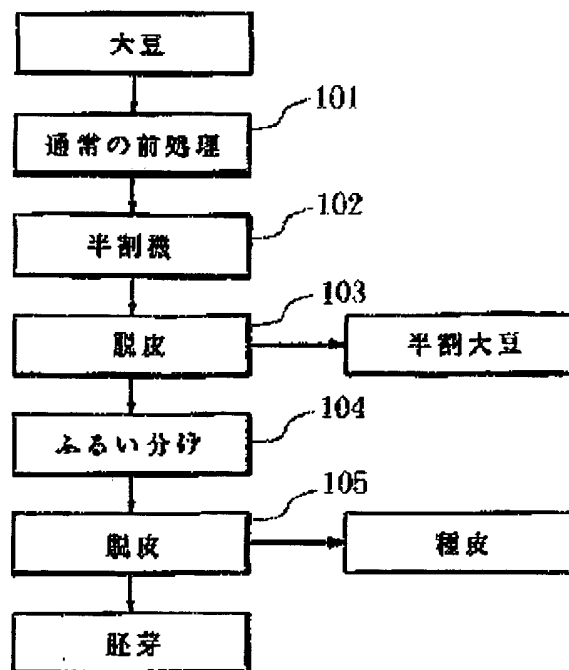
【0020】また、大豆を単に半割粗砕過程および機械による比重分離によりそのうちの胚芽を分離するので、胚芽の機能性營養素が破壊されず、胚芽の有効成分を保持できるという優れた効果がある。

20 【図面の簡単な説明】

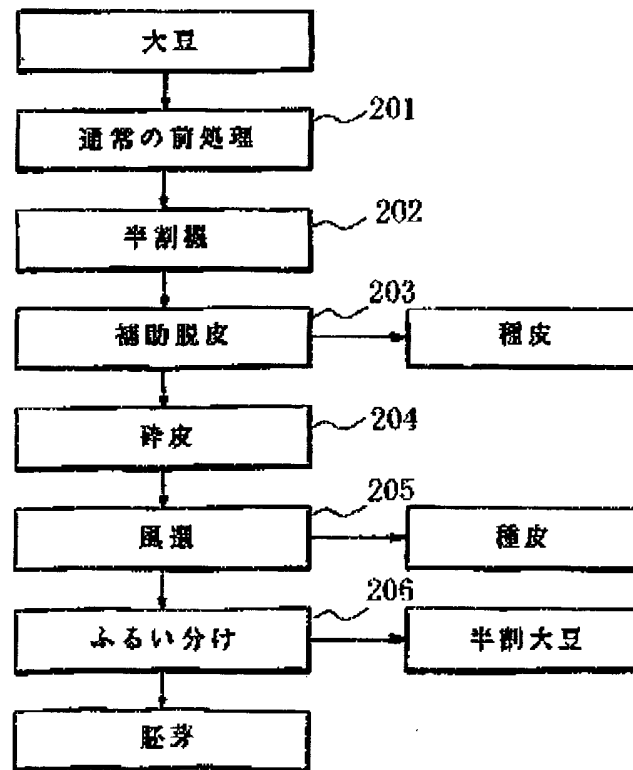
【図1】本発明による胚芽分離工程を示すブロック図である。

【図2】日本国特許公告昭59-82036号による胚芽分離方法を示すブロック図である。

【図1】



【図2】



【手続補正書】

【提出日】平成10年6月2日

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】0004

【補正方法】変更

【補正内容】

【0004】最近に入って生理活性物質中のイソフラボン(isoflavone)が機能性をもつ成分であることが認識され始めて米国においてだけでも最近にいたっておびたしい件数の大豆のイソフラボンに関する研究結果が発表されている。

【手続補正2】

【補正対象書類名】明細書

【補正対象項目名】0007

【補正方法】変更

【補正内容】

【0007】日本国特許公告第56-39176には、大豆の粉碎物をふるい分けと風選を繰返して大豆胚芽50～60%を含有する濃縮大豆胚芽を得る技術が紹介されており、日本国特許公告第62-100256号には、大豆胚芽濃縮物を高温高压下で低圧に放出させて胚芽のみを1.5～5倍に膨脹させて、これを比重分離して胚芽を得る方法が公知となっている。また、日本国特許公告昭59-82063号には、図2のブロック図〈符号201～206〉で示したように、通常の前処理の行われた大豆を半割機で粗砕した後、補助脱皮機で大粒皮を除去して砕皮機で種皮を粉碎後、風選機で種皮を除去してから、ふるい分け機で半割大豆と胚芽とに分離回収する方法が公知となっている。